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TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

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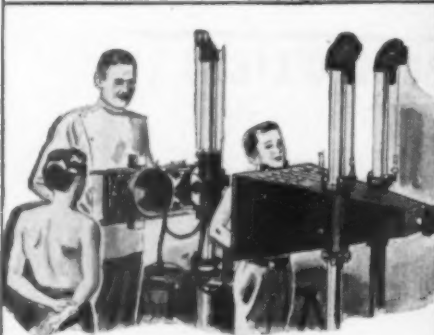
Waterspout
See Page 102

A SCIENCE SERVICE PUBLICATION

WONDER-WORKING WITH ELECTRONS



BOMBERS FROM THE BOTTOM OF THE SEA... There's a fabulous amount of magnesium... enough for 4,000,000 Flying Fortresses... in every cubic mile of sea water. To extract this vital metal from the ocean, vast quantities of d-c electricity are needed. An electronic device, the Westinghouse Ignitron, supplies this current by changing a-c to d-c — right at the water's edge. Ignitrons, with a combined capacity of more than 3,000,000 kilowatts, are now at work in magnesium, aluminum and chlorine plants, in electric railway systems, in mines, in many war industries.



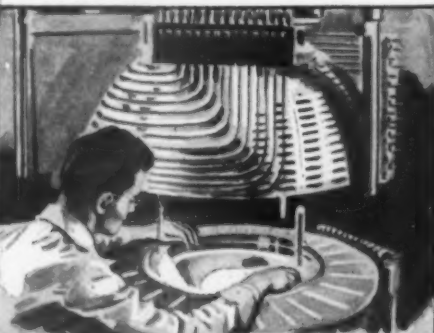
A NEW X-RAY machine, built by Westinghouse, makes possible the examination of 1000 school children daily — for symptoms of tuberculosis. X-ray pictures are taken by a 35 mm candid camera — at a cost of less than 1¢ per exposure.



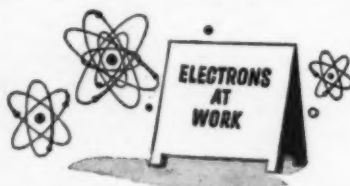
DUST TAKES A HOLIDAY... Dust-free air is absolutely essential in the assembly of optical equipment for our fighting forces. The Westinghouse Precipitron* electronic air cleaner automatically removes dust particles down to the size of 1/250,000th of an inch.



S-T-R-E-T-C-H-I-N-G THE TIN SUPPLY... Electronic high-frequency induction heating — developed by Westinghouse — helps save two-thirds of our war-scarce tin supply by flowing a protective tin coating, only 30-millionths of an inch thick, on steel strip.

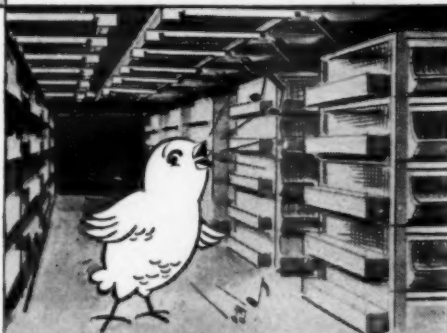


ELECTRONIC CHEMIST... The Westinghouse Mass Spectrometer analyzes intricate gas mixtures at amazing speed. In making synthetic rubber, for example, this electronic device cuts the time of chemical analysis from days to a matter of minutes.



Although one of the tiniest things in the universe, the electron is a gigantic force for the good of mankind. It is helping us to win the greatest war in history. It speeds production of goods for war and peace... brings entertainment into our homes... contributes to our health and happiness in countless ways. And wherever you find electrons at work you will find Westinghouse electronic research at the forefront!

*TRADE MARK REG. U.S. PAT. OFF.



SOMETHING TO CROW ABOUT... The Westinghouse Sterilamp, an electronic device, deals sudden death to air-borne bacteria in chick brooders — has reduced chick mortality by 50%. Sterilamps are used in restaurants, canneries, breweries, etc.

Tune in:
JOHN CHARLES THOMAS
Sunday 2:30 pm, EWT, NBC

Westinghouse
PLANTS IN 25 CITIES OFFICES EVERYWHERE

Tune in: **TED MALONE**
Mon. Tues. Wed. Evening,
Blue Network

NUTRITION

Emigration and Food

Running rats lead to new view that emigration among mammals is the result of food scarcity or deprivation but is not a planned response.

► A NEW view of the relation between food scarcity and emigration comes from a study of the activity of rats deprived of food. The study was reported by Dr. George Wald and Dr. Blanche Jackson, of Harvard University, to the National Academy of Sciences and is reviewed, in *Nutrition Reviews* (February).

Emigration among mammals, the Harvard studies suggest, is the result of food scarcity or deprivation but it is not a planned response. Animals do not, as has been generally assumed, emigrate in order to find food. They emigrate because the lack of food forces them into increased activity. Ancient history suggests that man may share in this pattern of response to food scarcity.

The real purpose of the emigration, or its "essential biological function," as the Harvard scientists put it, "is not to rescue the emigrating animal, though this may occur, but to relieve nutritional pressure on the home population."

The individual emigrant wanders aimlessly and persistently. Usually his wanderings end in disaster. If he survives, it is because he has happened to wander in the direction of a food supply.

The study supporting this new view was made with rats kept in activity cages in which they had free access to a running wheel. Normally, they ran an average of slightly under half a mile to slightly over a mile daily, or something under 2,000 revolutions of the wheel.

When the rats were deprived of food

or of water, their activity greatly increased. The revolutions of the wheel went up to about 10,000 daily. The same increased activity occurred when the rats were deprived of thiamin (vitamin B₁) or of another B vitamin, riboflavin. Deprivation of vitamin A and of various minerals in the diet did not have this effect.

The rats deprived of thiamin for long enough to result in polyneuritis finally ran much less than normally. If they are then given thiamin and allowed to eat freely, they quiet down and do not run much, meanwhile eating enormously and gaining weight. If they are given thiamin without increased food, they run enormously, because they are hungry for bulk food.

"High running," the scientists state, "is not, therefore, a reliable sign of well-being and optimal performance. It may be a sign of want. When healthy, intact animals are most completely provided with their needs they run minimally. This relation may be used as a criterion of dietary adequacy."

Running, they report in this connection, was consistently higher in a large group of animals kept on a synthetic diet containing all the factors known to be required by rats than when on a complete diet consisting largely of natural foods. This suggests that the synthetic diet still lacked factors which rats require and which have not yet been identified.

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ARTIFICIAL CLOUDS—Created in a bottle from liquid air and warm water, they are used to test insulating materials for the electrical systems of new bombing planes at the Westinghouse Research Laboratories.

usually brilliant or eminent men and women.

The brains are kept in glass jars on the shelves of his laboratory. On nearby tables on occasion may be seen hundreds of glass slides containing .031-inch slices from human brains. In the process of analyzing or "running through" a brain, 2,000 slices are made from one human brain. Every tenth one is mounted on a slide so it can be scanned under the microscope.

Condition of the brain cells and the structure are correlated with facts about the person's physical and mental characteristics. The information is important to brain specialists in treating their patients.

Dr. Papez says brains should be removed as soon as possible after death to be of value to the scientist.

The present collection was started many years ago by Dr. Burt G. Wilder, first professor of animal biology at Cornell. Latest acquisition is that of Prof. Simon H. Gage, who died last Oct. 20 at the age of 93.

Dr. Wilder retired in 1910 and the collection was more or less at a standstill until Dr. Papez joined the faculty in 1920. Where Dr. Wilder was more concerned with the anatomy of the brain, Dr. Papez is more interested in the microscopic work giving neurological information, and consequently in brains which present problems.

Dr. Papez says there are 26 basic items

MEDICINE

Brains For Study

Those of abnormal persons are more interesting to science than normal ones, head of Cornell Brain Association says.

► IF YOU are abnormal, the chances are science will be more interested in your brain than if you are a perfectly normal human being.

Cornell University has a collection of nearly 1,000 human specimens, and Prof. James W. Papez, curator of the collec-

tion and secretary of the Cornell Brain Association, says they are interested only in those brains that contribute most to science. These are the brains which present problems such as faculties that have been lost and recovered, brain diseases, congenital cripples, or the brains of un-

to study in a brain, and that it takes considerable time and costs several hundred dollars to "run one through."

The originator of the collection, Dr. Wilder, so inspired his students that many of them voluntarily signed a bequest form which he drew up as follows:

"Recognizing the need of studying the brains of educated persons rather than those of the ignorant, criminal, or insane, in order to determine their weight, form, and fissural pattern, the correlations with bodily and mental powers of

various kinds and degrees, and the influences of sex, age, and inheritance, I hereby declare my wish that, at my death, my brain should be intrusted to the Cornell Brain Association or to the curator of the collection of human brains in the museum of Cornell University for scientific uses, and for preservation, as a whole or in part, as may be thought best. It is my hope that my family and friends may not oppose the fulfillment of this my earnest wish."

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MEDICINE

Beriberi Cure Rapid

Americans rescued from Jap prison camp should recover quickly from this poor-diet disease; treatment will probably be doses of thiamin.

► CURE of beriberi, from which Americans rescued from the Cabantuan prison camp are said to be suffering, is usually very rapid. Improvement will come in a matter of hours after treatment is started, if the rescued men have not suffered irreparable damage to nervous system or heart.

The treatment will doubtless consist in giving large doses of thiamin, also known as vitamin B₁. This chemical, which is both cure and preventive of beriberi, was first synthesized by an American scientist, Dr. Robert R. Williams of the Bell Telephone Laboratories, as a result of studies on beriberi which he started in the Philippines in 1910.

Long before the vitamin had been isolated and synthesized, it was known to occur in foods and beriberi was known as a disease resulting from a poor diet. Ironically, one of the first persons to advocate that beriberi resulted from poor diet was the Surgeon General of the Japanese Navy, Takaki. In 1884 he was able to wipe out beriberi in that navy almost completely by changing the ration. It is reasonable to assume that the rations of Japanese sailors and soldiers today contain plenty of the anti-beriberi vitamin.

Oriental living chiefly on rice are likely to get beriberi because they eat polished rice. The polishing removes the thiamin from the rice, just as thiamin is removed from wheat in the processing of our fine white flour. To overcome this, our bread is now enriched by addition of thiamin as well as other vitamins and iron.

Beriberi has been considered relatively rare in the United States, but one au-

thority writing in 1943 stated that this is not true. The symptoms of the disease vary greatly. They include neuritis, muscle weakness and wasting, loss of coordination and of sensation, dropsy, and, when the heart is affected, difficulty in breathing, pain around the heart, blue color of the skin and rapid pulse.

Treatment of beriberi includes feeding a good diet as well as giving doses of the vitamin, thiamin. In this country, persons who had been eating such a poor diet that they got beriberi would probably also suffer from lack of other B vitamins. In the Orient, the poor diet that leads to beriberi apparently does not lead to other vitamin deficiencies.

For the people rescued from Cabantuan, the diet may consist in frequent small feedings of concentrated foods, but they are more likely to be given as much as they can eat. The danger of overfeeding is not the same for these malnourished persons as for men rescued from a life raft who have had nothing to eat for 30 days. Such persons cannot eat a lot all at once, probably because their digestive functions have been impaired. That is not so true in cases of vitamin deficiency and general malnutrition.

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INVENTION

Casein Curds Floated Out By Use of Carbon Dioxide

► FOR AN improvement in the method for extracting casein, milk's principal protein, E. L. Fritzberg of Minneapolis has been granted patent 2,368,919, which he has assigned to General Mills, Inc.

The conventional way of getting case-

in out of milk involves adding acid, which produces heavy curds that sink to the bottom. Subsequent handling renders the casein unfit for human food, so that it has to be diverted to lower-priced industrial uses. In Mr. Fritzberg's method, carbon dioxide or some other gas is introduced into the milk during the acidulating process, which results in the formation of bubbly curds that float to the top and can be mechanically skimmed off in cleaner condition, suitable for eventual incorporation into food products.

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ORNITHOLOGY

Heartbeats Counted

Using an extremely sensitive electrical instrument known as a cardio-vibrometer, the extra-rapid heartbeats of birds are accurately measured.

► EXTRA-RAPID heartbeats of birds, which normally have rates several times that of human beings, have been accurately counted in experiments by Dr. Eugene P. Odum of the University of Georgia, using an extremely sensitive electrical instrument known as a cardio-vibrometer. This has the advantage of not constraining the bird in any way, since nothing is attached to its body; there is thus no falsification of the record through fear or excitement. The instrument is attached only to the twig on which the bird perches, or even under the nest, and the very slight vibration caused by the heartbeat, translated into terms of electric impulses and amplified, is recorded by an automatic pen.

Dr. Odum measured the heartbeat rates for the tame canary and for nine species of wild birds, ranging in size from the mourning dove down to the ruby-throated hummingbird. In general, the smaller the bird the faster the pulse rate: the average basal rate for the ruby-throat was found to be 615 beats per minute, while that of the mourning dove is only 135—approximately twice the human heartbeat rate.

Heartbeat rates in birds can be speeded up terrifically under conditions of excitement or exertion: five of the ten birds tested had maximum rates of over 1,000 beats per minute, and all except the dove had maxima in excess of 800 per minute.

These extreme rates were maintained for only short periods; normally the rates were much lower, though still very high as compared with the rates in human beings. Thus, the basal rate in the dove was 135, while the maximum was 570. The cardinal had a basal rate of 445, a maximum of 810; the English sparrow's basal rate was 350, its maximum 902; the chipping sparrow had a basal rate of 440, a maximum of 1,060.

One peculiar phenomenon was noted in the case of naked young birds in the nest, which are cold-blooded, like lizards or frogs, when first hatched. Their heart rate at hatching changes directly with rise and fall in temperature, as a frog's heart does. However, as they be-

come a little older and assume their character as warm-blooded animals, increases in temperature bring a slowing-down of the heartbeat, and decreases speed it up.

Dr. Odum gives details of these and other observations in a report in *Science* (Feb. 9).

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CHEMISTRY

First Baekeland Award To Be Given Dr. Gilliland

► THE Leo Hendrik Baekeland Award of the North Jersey Section of the American Chemical Society will be presented in May to Dr. Edwin Richard Gilliland, professor of chemical engineering at the Massachusetts Institute of Technology, and formerly Assistant Rubber Director. He will be the first recipient of this award, which will be made biennially to an American chemist under 40 years of age for achievements in pure or industrial chemistry.

The Baekeland award, a gold medal and \$1,000 cash, was founded to commemorate the technical and industrial achievements of Leo Hendrik Baekeland, who died a year ago at the age of 80, after a life of activity in the chemical research field. He is best known for the invention of bakelite, the first commercial synthetic resin. This invention and the subsequent development of synthetic resins, commonly known as plastics, have had far-reaching effects on modern civilization.

Oklahoma-born Gilliland, who joined the teaching staff at M. I. T. in 1934, is the author of numerous published papers, and is known as an advocate of the maintenance of a postwar synthetic rubber industry in the United States as essential to the national interest.

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BIOGRAPHY

Dr. William H. Howell, Physiologist, Dies

► THE DEATH of Dr. William H. Howell, distinguished physiologist of the



WILLIAM HENRY HOWELL

Johns Hopkins University, in his 85th year (Feb. 6) marks the end of an epoch in medical education. He was the last surviving member of the first faculty of the Johns Hopkins Medical School, which included the school's internationally known "Big Four," Dr. William H. Welch, Dr. Howard A. Kelly, Dr. William Stewart Halsted and Sir William Osler.

As professor of physiology, dean of the medical faculty and director of the School of Hygiene and Public Health, Dr. Howell contributed in no small measure to the achievements of the Hopkins which, from its start, pioneered a new trend in medical education in this country.

Isolation of the anti-blood clotting substance, heparin, was one of Dr. Howell's own achievements in the medical research for which the institution is famous. His teaching reached far beyond the Hopkins through his *Textbook of Physiology*, widely used and standard text now being prepared for its fifteenth edition.

Besides his role of medical educator, Dr. Howell was interested in education of the general public in science and served for 10 years as chairman of the executive committee of Science Service.

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CHEMISTRY

More DDT Victories

Malaria and fly-borne diseases are controlled by spraying a 5% solution in kerosene in mess halls, kitchens, and military sleeping quarters.

► DDT, already acclaimed for success in aborting the typhus epidemic in Naples, now is helping to control malaria and fly-borne diseases, reports Maj. George C. Brother of the Medical Corps, attached to the 15th Air Force. Units of enlisted airmen directed the killing of adult mosquitoes and flies in the area, using a 5% DDT solution in kerosene, and applying it with power paint sprayers, hand spray guns and paintbrushes to prevent the spread of malaria and diseases carried by flies. The mixture is applied by two-man teams to military mess halls, kitchens, latrines, and civilian as well as military sleeping quarters.

DDT arrives in Italy in hard, waxy lumps, which are pulverized in a meat grinder. The solution is made up by

adding the pulverized DDT to kerosene and pouring it into five-gallon oil cans. Cans of this mixture are stacked in the sun to hasten solution and are rolled around on the ground every 24 hours. A good solution is obtained in about four days.

Spraying teams, after a half-day of schooling in malaria control, begin applying the poisonous solution to walls, doors and screens of buildings. The men wear protective masks. These teams also seek out nearby breeding places of flies and of mosquitoes which might infect soldiers with malaria.

Some reports indicate that the insecticide did not have immediate results. However, after several days medical officers were convinced of its effectiveness. Observations show that areas have



WATERSPOUTS—This picture, and the one on the front cover of this *SCIENCE NEWS LETTER*, help dispel the belief that waterspouts are "solid" columns of water. Actually they are rotating columns of cloud. The ones seen in these rare photographs taken by Lt. R. W. Field, Jr., of the Mediterranean Allied Air Forces, are 200 feet in diameter and 2,000 feet high. They are the result of convective activity that occurs when cold air moves over a warm sea area, and can be best likened to a tornado over water. The spray at the base of the waterspout obscures the point where it touches the water and indicates an area of destructive winds about 500 feet in diameter. Beyond that area the water is scarcely disturbed.

to be re-sprayed about every month or six weeks.

According to Maj. Brother, the results have been spectacular from the standpoint of pest control, and DDT can be considered valuable to the prevention of both malaria and enteric diseases.

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GENETICS

Children Do Not Inherit Weakness for Strong Drink

► CHILDREN of alcoholic fathers or mothers do not inherit their parents' weakness for strong drink, a study of 36 such children who had been raised in foster homes revealed to Dr. Anna Roe, of Yale's Section on Alcohol Studies of the Laboratory of Applied Physiology (*Quarterly Journal of Studies on Alcohol*, December).

The children were studied after they were grown; they averaged 32 years of age at the time of the study. And they were compared with a control group, also raised in foster homes, who were the children of non-alcoholic parents.

No drunkards were found among either of the groups. Of the alcoholic-parentage group, 7% use alcohol regularly, 63% occasionally and 30% do not touch it at all. The figures were not very different for those whose parents were not alcoholics. Of these, 9% use alcohol regularly, 55% use it occasionally and 36% are teetotallers.

Of children of alcoholic parents brought up by their own parents 20% to 30% become alcoholics, it has previously been found.

Although alcoholism is a disease chiefly of later life, the good adjustment of the group studied by Dr. Roe and the absence of heavy drinking at the age of 32 would seem to indicate that they are no more likely to become alcoholics later than are the rest of the general population, Dr. Roe concludes.

The children of the alcoholic parents were not placed in their foster homes until they were between five and six years old, as compared with two and a half years for the other group. Many were abused by their own parents and the foster homes were not quite so good as those of the children of normal parentage.

Dr. Roe expresses surprise that they turned out so well in spite of this early handicap, becoming not only useful citizens but reasonably contented persons, working adequately, with pleasant family lives and sufficient friends.

"No one who has read the records of some of these lives and pondered on them can escape a profound sense of awe

at the biological toughness of the human species," she comments.

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BIOCHEMISTRY

Vitamin Factory

The fact that a cow's stomach can turn out a surplus of B-complex is again engaging the attention of scientists. Work is done by bacteria.

► A COW'S stomach is a vitamin factory, capable of turning out not only enough B-complex for her own needs but a surplus that is excreted with her digestive wastes. This fact, originally discovered in researches at Pennsylvania State College some 15 years ago, is again engaging the attention of scientists.

Specifically, the part of the cow's complex stomach where vitamins are produced is the pouch known as the rumen. The vitamin manufacture is not accomplished by the body processes of the cow herself but by swarms of bacteria living in the rumen, working on the often low-vitamin diet on which the animal feeds.

Vitamin benefits from the cow's digestive processes have been known in a crude fashion for a long time: it is a common barnyard observation that skinny, runty chickens "perk up" if they have a chance to scratch for chance grains in a heap of cow manure.

Conclusive evidence that vitamins of the B-complex are synthesized by bacterial action in cows' rumens was obtained in 1928 by S. I. Bechdel and associates, J. F. Shigley, Hannah E. Honeywell, R. Adams Dutcher, and M. H. Knutsen. They had found previously that young calves make normal growth on rations shown to be vitamin B-complex deficient in tests on rats.

Penn State Jessie, a cow which achieved great public interest because of the window in her side, figured largely in these vitamin B synthesis tests, supervised by Dr. Bechdel. Quantities of partially digested feeds were removed through this opening for chemical and bacterial analysis.

Subsequent experiments at other stations have shown that a cow produces sufficient of the B-complex vitamins for her own needs from feeds low in this constituent, and if properly fed, excretes large quantities which may be used by other animals.

Scientists and feed manufacturers now are concerned with the problem of how

to include the B vitamin eliminated in cow manure in feeds for other forms of livestock without offending customers or an over-sensitive public. The source of vitamin B fed may be quickly forgotten, however, if superior animal products result.

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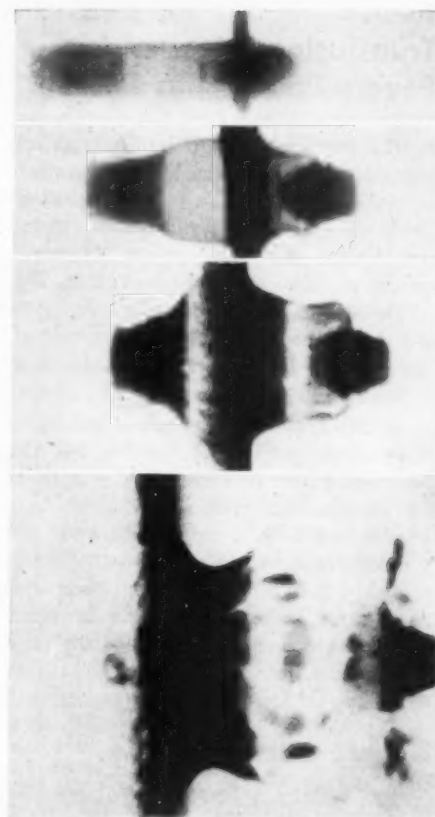
ELECTRONICS

X-Ray Tube Takes Pictures In Millionth of a Second

► EQUIPMENT containing an X-ray tube which takes pictures in a millionth of a second is now used by an Army arsenal to study the behavior of a bullet passing through the bore of the gun and its piercing action as it hits an object, and also the behavior of a high-explosive shell as it hits a steel plate. It can also be used to study the action of the component parts of valves or of other machinery during operation, and to photograph accurately such action as the inner structure of golf balls at the moment of impact.

Ultra-speed X-raying is the "only adequate method of determining how a bullet or shell behaves as it hurtles down the bore of a gun or as it strikes the target," explained Dr. Charles M. Slack of the Bloomfield plant of the Westinghouse Electric & Manufacturing Company, who developed the tube, at a recent meeting of scientists in Cleveland. "One failed bullet might jam a machine gun, and studies made possible by high-speed X-ray photographs at arsenals and proving grounds in this country and in Great Britain have been of inestimable value."

Photographs with the new equipment show that a high-explosive shell inflates to twice its normal diameter just before it appears to finally burst open inside a steel plate, he said, and the blast that accompanies the firing of a rifle bullet will beat the missile to the muzzle of the gun.



RADIOGRAPHS—This series of high speed radiographs shows how a high explosive shell swells up just before it appears to burst open inside a steel plate. In the top picture, the nose of the shell is through the plate; almost half the shell has passed through in the second picture; in the third, the shell has just burst open; and in the last, the shell is wide open, the petals on the back of the plate curling back to make a large hole.

A series of radiographs made with the super-speed tube at an American arsenal showed that the 20-millimeter high-explosive projectile swelled, burst and disintegrated during the penetration process, he added. The force of the explosion blew a huge jagged hole in the steel plate.

The tube will have many postwar uses, he continued, in metallurgical and other industries. It can be used, he said, to study rapidly moving machine parts such as automobile valves. "We no longer will have to wait until those parts perform to see what causes unnecessary wear and failure. With the help of the high-speed X-ray camera we can watch those parts tick while they are ticking."

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MEDICINE

Transfusions Needed in Severe Pneumonia Cases

► BLOOD and plasma transfusions are needed to complete the life-saving effect of penicillin, sulfa drugs and serum in severe pneumonia, four Boston physicians point out in a report (*Journal, American Medical Association*, Feb. 10).

The four physicians are Drs. S. Howard Armstrong, Jr., Albert C. England, Jr., Cutting B. Favour and I. Herbert Scheinberg.

In two cases they report, penicillin stopped the pneumonia germs, but the patients became so anemic and so starved for protein that they almost died. One patient, an 85-year-old man who developed pneumonia after a prostatectomy, probably had been undernourished and anemic for some time before the operation and pneumonia. Badly fitting false teeth and poor appetite led to a diet consisting chiefly of tea, starches and sweets, with a daily egg nog and occasionally a small piece of pork.

In the other case, there was no sign of undernourishment before the pneumonia. The attack was so severe, however, and involved so much of his lungs that even though the germs were stopped by penicillin, the patient was "in desperate need" of treatment to relieve the difficulty in breathing and in getting enough oxygen into his blood to keep life going.

Such cases will be seen increasingly often, the Boston physicians believe, as powerful antibacterial drugs such as penicillin control germ infections that would otherwise be fatal. They suggest that in severe pneumonias physicians anticipate the development of anemia and deficiency of protein in the blood and give blood and plasma transfusions and adequate protein in the diet early in the sickness.

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PHARMACOLOGY

English Titles to Be Used In New Pharmacopoeia

► DOCTORS may still write their prescriptions in Latin, but when they look up a drug in the Pharmacopoeia, they want to find it under its English name. Consequently English titles will take first place, Latin titles second place in the new U. S. Pharmacopoeia, scheduled to appear in December 1945, according to an announcement from Dr. E. Fuller-

ton Cook, chairman of the U. S. P. Committee of Revision. Although medical members of the Revision Committee have been the chief advocates of this change, other users of the Pharmacopoeia besides physicians are expected to benefit, since the new style makes possible the grouping of related products in one place.

At present digitalis preparations, for example, are scattered through the book under class names such as Capsulae, Injectio, Tabellae, Tinctura, and the like. This resulted from the style of putting substances in alphabetical order under their Latin titles. The person looking up digitalis capsules had to hunt under Capsulae through all the other kinds till he came to Capsulae Digitalis. Then if he wanted to compare these with requirements or standards for digitalis tablets, he had to search under Tabellae. With the new style, he will merely look for digitalis. All U. S. P. digitalis preparations will be grouped there in alphabetical order.

The Latin titles will not be dropped, but will be placed after the English titles.

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CHEMISTRY

John W. Thomas Receives American Chemical Award

► THE GOLD medal of the American Institute of Chemists has been awarded to John W. Thomas, chairman of the Firestone Tire and Rubber Company, in recognition of his leadership in rubber research during the past four decades and for achievements in the development and production of synthetic rubber made under his direction. The medal will be presented on May 11 at Columbus, Ohio, during the twenty-third annual meeting of the Institute.

This medal is awarded annually by the Institute for noteworthy and outstanding service to the science of chemistry or the profession of chemist in America. The recipient is selected by a jury of outstanding chemists representing the Institute.

Mr. Thomas, the son of a Welsh coal miner, worked his way through what is now the University of Akron, and received a bachelor of science degree in 1904. In 1908 he installed the first chemical laboratories at Firestone. He made chemical research a major arm of the industry and directed work which developed tires of synthetic rubber more than a dozen years ago.

Science News Letter, February 17, 1945

IN SCIENCE

ENGINEERING

Floating Refrigerators To Carry Cheese, Eggs

► THERE'LL BE ice cream, fresh meat, cheese, and eggs for American soldiers stationed in the Pacific war theater, brought to them in a new type of barge the Army has built for the purpose, the War Department reports. Three floating refrigerators, each costing \$1,120,000, can store 64 carloads of frozen meats at 12 degrees above zero in the eight main holds. Two main deck compartments each have a capacity of about 500 measurement tons of fresh vegetables, cheese, eggs, and other perishable produce.

In addition, each barge has a special unit that turns out 10 gallons of ice cream every seven minutes and a plant that manufactures five tons of ice a day. The barge's elaborate cooling machinery is operated by 84 electric motors with capacities up to 150 horsepower. A complete change of arctic air is provided every four minutes to all chill and freeze compartments by 12 blowers.

The barges have flat-bottomed concrete hulls, are 265 feet long with a 48-foot beam and a 12- to 15-foot draft. They carry a crew of 10 men and 13 officers. The floating refrigerators will operate only in the southwestern and western Pacific. Small boats, operated by the Transportation Corps, will pick up the cargo and deliver it to troops, on an inter-island service.

Science News Letter, February 17, 1945

CHEMISTRY

Enamel-Lined Tubes Used To Make Hydrogen Peroxide

► A new way has been devised to make hydrogen peroxide—a compound of even greater importance in industry than it is in the theater district. Dr. Gerhard A. Cook of Snyder, N. Y., makes it directly from oxygen and hydrogen gases by putting a properly proportioned mixture through enamel-lined tubes with very smooth walls at a temperature of around 520 degrees Centigrade, at moderately high pressures. On this process he has received patent 2,368,640, rights in which are assigned to the Carbide and Carbon Chemicals Corporation.

Science News Letter, February 17, 1945

THE FIELDS

PUBLIC HEALTH

Twice As Much Undulant Fever Reported This Year

► ALMOST twice as many cases of undulant fever have been reported to the U. S. Public Health Service so far this year as during the corresponding period of 1944. The total to Feb. 3 was 354, compared with 184 for the same period last year.

Undulant fever is also known as Malta fever and brucellosis. It is not often fatal but is a long drawn-out sickness, lasting sometimes for years. The suffering, disability and economic loss are considerable.

People get undulant fever, usually, from drinking raw goat's milk or raw cow's milk that contains the germs. Pasteurizing milk is a sure safeguard against undulant fever from this source. Humans may also get the hog variety of brucellosis, but this is not very common. Farmers, veterinarians, slaughterhouse employees, butchers and even cooks can get it from handling infected meat or from close contact with infected animals.

Reporting of cases of undulant fever is now required in all 48 states and the District of Columbia. Last year, however, was the first in which all states reported the disease. It is possible that during this first year not all cases were reported while more are being reported this year. This might account for some of the increase.

The nation's health is otherwise good with no major increases in communicable diseases reported to the U. S. Public Health Service.

Science News Letter, February 17, 1945

ENGINEERING

Snow May Be Melted as It Falls on Airport Runways

► SNOW WILL be melted as fast as it falls on airport runways, if suggestions made by radiant heating experts are put into practice. Underground piping carrying steam or hot water would be used similar to systems successfully operating in the floors of factories and for heating homes. The same method is already used under outdoor walkways and loading strips to keep them clear of ice and snow. It would be cheaper in the long run, it

is claimed, than the present expensive operation of keeping runways cleared by the mechanical removal of the snow.

Snow removal from runways on commercial airports is one of the major problems in areas with heavy snowfalls and many flights have to be cancelled because runways are often snow bound. Airports now are required to have heavy investments in snow-removal machines and expend large sums for labor. Underground heating of the runway to a temperature of about 45 degrees would turn the snow to water, and evaporate the water, keeping the runway dry and always in condition for use. It would do so, it is claimed, at a much less cost than present mechanical removal operations.

The cost of installation would constitute the principal expenditure. Operation and maintenance costs would be low, as heat would be applied to the runway only while snow is falling or drifting. Snow in the air does not make flying hazardous unless severe, but snow or ice on the runways where planes must land is dangerous.

Science News Letter, February 17, 1945

GENETICS

Heredity-Changing Drug Applied by Aerosol Method

► COLCHICINE, the drug that changes the hereditary characters of plants by increasing the number of chromosomes per cell, can be applied effectively to scores or hundreds of young plants at a time by the aerosol method, originally used with insecticides to make wholesale kills of winged pests. Use of colchicine as an aerosol was developed by three U. S. Department of Agriculture research scientists, J. W. McKay, P. C. Burrell and L. D. Goodhue, at the great experiment station at Beltsville, Md. They present preliminary results (*Science*, Feb. 9).

Greatest effect in changing the genetic makeup of plants was obtained when the dose was most drastic, the three researchers state. They got highest percentages of change among survivors of blocks of young plants after aerosol-spray treatments that killed most of the seedlings with which they started out.

They also suggest that better penetration of the colchicine, and hence most effective use, may be obtained by mixing into the solution some mildly poisonous chemical that will lower the resistance of growing tissues to penetration. They state that they are now at work on experiments along this line.

Science News Letter, February 17, 1945

CHEMISTRY

Rubberlike Plastics To Coat Cloth, Paper

► NEW RUBBERLIKE plastics, with valuable wartime and postwar uses, will be made in the near future in a new plant to be constructed by the Goodyear Tire and Rubber Co., which will have a capacity of 3,000,000 pounds a year. The new materials, developed by scientists of the company during the past two years, can be used to coat cloth and paper, package foods, drugs and tobacco, insulate electric wiring, and protect machinery during shipment to tropical regions.

These new synthetics, that can be used to relieve the critical shortage of natural rubber products, are vinyl chloride copolymers. They are made by passing two gases, acetylene and hydrogen chloride, over catalysts in large tanks by a process very much like that used in making GR-S rubber from butadiene and styrene. GR-S rubber is a co-polymer made by joining the molecules of butadiene to the molecules of styrene. Each of the new co-polymers to be made in the new plant will consist of molecules of vinyl chloride joined with the molecules of some other substance to form the giant molecules of the plastic.

The new plastics can be vulcanized like rubber in the equipment ordinarily used by the rubber industry for that purpose. They resist the deteriorating effects of sunlight, and are also oil-resistant and may be used for gaskets and washers, wherever an elastic, rubberlike substance resistant to oil is required.

An experimental tire has been made of the new material, but it is not expected at present that it will come into general use for tires.

Science News Letter, February 17, 1945

ORDNANCE

Two-Wheeled Carriage For the Heavier Mortars

► MORTARS, which up to now have gone into action on men's shoulders, on muleback, or in trucks, are put into the field artillery class by Edgar W. Brandt, the French inventor who is responsible for much of their improvement over the crude weapons of World War I date. He provides a two-wheeled carriage for the heavier types; though his design calls for slipping them off the wheels and onto the customary base plates when preparing to fire.

Science News Letter, February 17, 1945

PSYCHOLOGY

Why Men Marry

Six reasons may be given by men when they tell you why they married or why they want to marry, psychologists tell the returning serviceman.

By Marjorie Van de Water

► "DEAR JANE: Will you be my valentine?"

When GI Joe writes this, the-duration-and-six-months from now, what sort of girl will he pick? And how can he be sure that he will not be getting back from a global war only to start a marital war in his own living room or bedroom? Will his own combat nerves, if he suffers from them, get in the way of his happiness at home?

These and many other questions of interest to the soldier or sailor either when he gets ready to come home or as he reads this year's crop of sweet valentine greetings are discussed in a forthcoming book on "Psychology for the Returning Serviceman," prepared by a large group of scientists and servicemen for the National Research Council and Science Service, and soon to be published by the *Infantry Journal*.

Love, marriage, and happiness in the home are the topics of only a few of the chapters of this book on everyday psychology, which also discusses such personal problems as how to get a suitable job, how to learn new industrial skills, how to get well and build up mental as well as physical health, and how to get along with certain special disabilities that may result from war wounds.

Six Reasons Given

Six reasons may be given by men when they tell you why they married or why they want to marry, the psychologist-authors tell the returning servicemen. Here they are:

Comforts. A man likes good home cooking. He wants a fire to sit beside with his feet up in the evening. He wants the buttons sewed on his shirts.

Sex. A man needs an outlet for the powerful sex drives within him. And it is much better for many reasons to have a legitimate outlet—one that won't get him talked about, one that is safe from disease and other entanglements, one that is respectable.

Pride. A man may marry a good-looking or charming woman in somewhat the same spirit that he picks out a good

car or builds a nice house. He is proud to be seen with her. He gets a thrill out of introducing her to his friends.

Companionship. An unmarried man will have very little chance to share the intimate thoughts of his life, his private troubles and problems, his personal successes. There are lots of jokes about how women gossip, but all the same a wife is sometimes the ideal person to tell things to. And with a good wife a man can enjoy life; they can have good times together. And when troubles come, sharing them with someone close makes the troubles bearable. Such companionship makes life richer.

Social Position. Marriage is important to a man's standing in the community and in the eyes of his employer. Married men are often considered more reliable, more steady as workers than single men. There is good reason for this: A man with a wife and perhaps children dependent upon him is not so likely to take chances as a single man is. He is not so likely to leave a good job and go off somewhere looking for change or adventure. And the fact that a man has assumed the responsibilities of marriage is some evidence that he is a responsible kind of person. In addition, the married man is in a position to entertain his friends and acquaintances in his home, and that is important to social standing.

Love. A man may feel that he wants to marry simply because he has fallen in love.

These are all good reasons for marriage. They are the reasons you may already be aware of. But actually you seek marriage for a great many other reasons that you may know little about because they are deep-hidden reasons that are a part of your nature.

In marriage you find the fulfillment of cravings that you may never have clearly understood. You may know that as a single man you are somewhat restless and discontented. You go around looking for something without ever finding it. You can't seem to "settle down." Maybe you play around with one girl after another, hoping that each one will give you something you need for your

contentment; but none of them do, and so you soon say goodbye. Maybe you try one job after another. Or one town after another.

Then at last you meet the girl and you quit running around. Home is where she is. Your heart is there with her.

What are these cravings? One of them is sex, not just in the narrow sense that you want physical relief; you may have got that outside of marriage. It is sex need in the much broader sense that includes a desire for everything that you have associated with good women ever since you were born. You need some affection, kindness, someone who has a genuine interest in you. You need the care that is like the care a good mother gives, all the warmth of a woman's love. And you need to express your own tender emotions. You need to love.

Men have opposite sides to their natures, equally human. Sometimes you want to tear things up, to rip them apart, to smash and crush and hate. But it is also important for a man to build, to create, to make things grow, to protect and to love. The two drives, although conflicting, are not separate; they are all mixed up together.

War offers many men plenty of chance



WRITING HOME—When he writes to the girl friend, what is he thinking of? Some men think they marry for sex, some for comforts, but all are probably led by things they do not understand. This photograph of a sailor writing aboard a warship was taken by a U. S. Navy photographer.

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A MICA MINE IN A LABORATORY

War shortages crop up in strange materials. Mica, for instance. Once seen principally in the windows of stoves, and in boys' pockets, it is now used extensively as electrical insulation. In some products, it is almost indispensable: capacitors for radio, spark-plugs for airplane engines, insulators in electronic tubes.

With demand mounting, manufacturers were desperate. A four-man technical mission flew to

London to help ration the world's supply between the United States and Great Britain. The shortage was serious.

The War Production Board, convinced that much mica was classified too low when judged by appearance alone, asked Bell Telephone Laboratories to develop a new method of electrical tests. The Laboratories were able to do this quickly and successfully because of their

basic knowledge and experience in this field.

The new tests were made available to manufacturers in this country and abroad — the supply of usable mica was increased 60% — and a difficult situation relieved.

Skill to do this and other war jobs is at hand in Bell Laboratories because, year after year, the Laboratories have been at work for the Bell Telephone System.



BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for our Armed Forces at war and for continued improvements and economies in telephone service

Do You Know?

Lack of *iron* in early life of swine is the forerunner of many of the infections to which they are subject.

Modern *face powder*, in addition to coloring and perfume, includes substances such as kaolin, talcum, starch, siliceous earth, zinc oxide, zinc stearate, titanium oxide and magnesium oxide.

The *wild cabbage*, a plant of the French invasion coast and other places in the western edge of Europe, is the reputed ancestor of the many forms of cultivated cabbage and kale.

Nearly 20,000,000 *fur-bearing animals* were taken in the United States and Alaska during 1943; the fur catch was worth approximately \$100,000,000 to the trappers.

A *Danish mechanic* made his first solo flight in a stolen German plane and was shot down over Sweden, only slightly injured, where he is now treated as a civilian refugee.

Several hundred American *musk rats*, imported from the United States into Siberia in prewar days, acclimated quickly and their offspring have furnished tens of thousands of skins for Russia in the past few years.



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From Page 106

to destroy, to blow things sky high. There is plenty of chance, too, to hate and to kill. There is also building in war—construction of bridges, barracks, machines. But war is mostly a business of destruction. In the service you may have had plenty of chance to be a fighter, but mighty little to be a lover. No man's life is complete without a chance for both.

And so soldiers and sailors often go home to "gang plank" weddings and some don't even wait to get home but marry in foreign lands. It is mostly a strong need that impels them, and the reasons that their minds figure out may not be the really important one.

And the need is not one simple urge, but many of them tied together. You need marriage because when you are married you find satisfaction for your tender desires. But you also need marriage because it is permanent—it means the end of running around, of uncertainty and change. You want to strike roots.

And you may want marriage because you have a need to father children whether you ever realized it or not. You want new life to come into being bearing your likeness. That is the only way you can survive beyond your allotted years on this earth. It is your hope for immortality among mortal beings.

Not every soldier and sailor will return home and immediately find the right girl and get married. Some will not be able to marry or, if they do marry, will not be able to find happiness in it. For some a long period of adjustment may be necessary before they can be reasonably sure of being a good husband.

If you happen to be one of these, you won't be alone. There are understandable reasons why war experience should make it harder for some men to find and keep a wife.

Science News Letter, February 17, 1945

AERONAUTICS

Glider Carries 16 Men, Designated as the CG-15A

➤ A GLIDER with a nose that opens like a giant mouth is one of the youngest members of the Army Air Forces family of motorless aircraft. The result of more than three years of research, the new glider has a strongly reinforced nose section, clipped wings, and landing gear with improved shock-absorbers.

Designated as the CG-15A, it will accommodate 16 men, including pilot and

co-pilot, and an alternate two-ton load of rolling mechanized equipment. Design changes increase the useful load of the glider 500 pounds over previous similar models, "up" the towing speed from 150 to 180 miles an hour, and provide better crash protection for the crew.

Built by Waco Aircraft Company, the CG-15A has a high-wing fuselage formed from steel tubing and covered with cotton fabric. The wings and tail surfaces are made of wood. It has a wing spread of more than 62 feet and an overall length of more than 48 feet.

The nose of the new glider is one of its most outstanding features. Sealed with clearvision panels, it affords greater visibility and more convenient controls. Reduction of power required to tow the glider at speeds exceeding 100 miles an hour was made possible by clipping 20 feet from the wing-span of the earlier model, the CG-4A.

The predecessor of the CG-15A, the CG-4A, spearheaded the invasions of Sicily, Normandy, Holland and Burma, and set a pattern of achievement as well as one of construction for the new glider.

Science News Letter, February 17, 1945

Facts ABOUT



VICTORY GARDENS

— — — LISTEN — — —

"ADVENTURES IN SCIENCE"

WITH

WATSON DAVIS

Guest: Dr. P. V. Cardon

SATURDAY, FEB. 24

2:15 EWT—CBS

Science Service Feature

FORESTRY

NATURE RAMBLINGS

by Frank Thone



Multiple-Purpose Forestry

► FORESTERS in this country a generation ago were taught to admire and follow the lead of German foresters, who had been making and caring for forest plantings while we were still in the stage of wasteful exploitation of our own natural timber resources. Men who had visited the carefully cultivated woodlands in the *Vaterland* were loud in their praise of the orchard-like spacing and regularity of arrangement, with trees all of the same kind and age in blocks, so that all would grow up together and be ready for harvest together. They commented favorably on the table-like neatness of the forest floor, swept clear of dead branches, snags, stumps and debris generally. These were held up as models for the young profession of forestry in America.

Even if these practices had been entirely correct (they weren't), they would not have been well adapted to American conditions. That strictly drilled arrangement, with trees like soldiers and the forest floor like the floor of a well-policed barracks, was possible only in a land where plenty of intelligent labor was available, and at relatively low wages, too. The complete sweeping up of dead limbs and other rubbish was due in part to the intense need for domestic fuel in nearby towns—a situation hardly paralleled in the endless wildernesses of our West or in the piney woods of our Southern coastal plain.

But even where achievable, this highly regimented German forestry was not ideal. Having all the trees of the same kind and age over large blocks tended to encourage epidemics of tree diseases and outbreaks of insect pests, that could sweep through the solid blocks without a break. When all the trees in a block

were felled, too much soil surface was left exposed to the weather and consequent erosion, necessitating expenditure of much labor for protection.

There is a definite trend in the later American reforestation programs to mix the plantings, putting clumps of hardwoods in among the spruces and pines. Some authorities even advocate the inclusion of such trees as wild cherry and hawthorn, which foresters used to term "weed trees," because they furnish food for game animals and birds, thereby en-

hancing the recreational value of the forest.

Certainly no progressive forester now would tolerate the completely clean cutting of any timber area, whether natural or planted. Mowing a forest down like a wheat-field is condemned by all hands as bad business; selective cutting is the present-day watchword. And in the succession-growth that follows such cutting, the forest of mixed species and all ages has a very definite advantage.

Science News Letter, February 17, 1945



B&L Altimar f:4 lens in Fairchild (F-56) Aerial Camera.

From 65° Below to 160° Above . . . No Lens "Blackouts"



To maintain the definition that will reveal individual railroad ties from an altitude of five miles, each lens element in our Army's and Navy's high flying aerial cameras has to represent the highest of precision optical standards. In addition, the cement that holds these elements together must be resilient enough to withstand frequent extreme changes in temperature without dissolving, melting, or crystallizing . . . temperatures ranging from the extremes of stratosphere cold to desert heat.

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world, will assure you of better, longer lasting optical equipment.

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RADIO

Radio Station in France Has Washington Hookup

➤ OVER 400,000 words a day are sent out by the Army's super radio station in France, that has direct hookups with London, Washington and the Army's worldwide radio communications system, the War Department states. The multiple-channel 40-kilowatt station, costing an estimated \$2,000,000, was sending and receiving trans-Atlantic messages 25 days after it arrived in France in 1,000 shipping boxes.

The power of this station may be compared to some of the major standard broadcasting stations in the United States. Station KNX in Los Angeles, WBBM in Chicago, WLW in Cincinnati and WABC in New York are all rated 50 kilowatts, and these are among the most powerful broadcasting stations in the country.

Combat-line communications are built around radio. All field units have their own networks. In addition, every tank has a radio, and a certain number of infantrymen from each company are equipped with "walkie-talkie" sets. Because of its elasticity, radio can keep men stitched together into a fighting team in almost any situation.

Many times during the racing pursuit of the Nazis toward Germany, wire could not keep the immediate pace with fast-moving armored columns. The Signal Corps solved the problem by intro-



LAP-SIZE PIANO—Harold B. Rhodes demonstrates his new portable piano, which he invented for bed-patients, to soldier patients at Bolling Field Hospital. In building this instrument with filed tubes instead of strings, he used aluminum tubing from the hydraulic system of wrecked planes and plywood from abandoned engine crates. Eight models have already been built for demonstration at each of the AAF convalescent hospitals in this country.

ducing a system of very high frequency radio relay stations. This system consists of broadcasting stations 25 to 100 miles apart, each beamed on the next, like a chain of elephants hanging onto each other's tails. This system was first tried out in North Africa.

The equipment used is similar to that employed by police scout cars, only more elaborate. It provides four teleprinter circuits for the transmission of printed messages plus three radio-telephone circuits for voice transmission. The actual equipment was developed in the United States and England.

Science News Letter, February 17, 1945

CHEMISTRY

"Bottled Gas" for Use in Combustion Engines

➤ "BOTTLED GAS," now widely sold in cylinders for kitchen purposes in areas beyond the reach of city gas mains, is made available for use in internal combustion engines, both automotive and stationary, through an adapter on which U. S. patent 2,368,680 has been issued to John Riise of Doylestown, Ohio.

This fuel consists of a mixture of

butane, propane and other light hydrocarbons that are gases under ordinary conditions but readily liquefy under pressure. This makes their handling in cylinders easy and economical.

Mr. Riise re-converts the liquid fuel into a gas by warming it in a water-jacketed cylinder around which water from the engine's cooling system circulates. In place of the carburetor he uses a special mixing valve, to add the correct proportion of air.

Science News Letter, February 17, 1945

MATHEMATICS DICTIONARY

Invaluable in reading any book that uses mathematics.

The James Mathematics Dictionary

the only such book now published, provides standard definitions of the terms and phrases from arithmetic through elementary differential equations, the technical terms ordinarily used in the applications of these subjects, and more advanced basic terms. Easy examples, many illustrations and all sorts of formulas are included. The appendix contains tables of weights and measures, a list of mathematical symbols and tables ordinarily used in handbooks.

This dictionary is a great deal more than a collection of definitions. It explains, illustrates and correlates, stressing especially those operations that are hardest to understand. One reader has called it "Ten texts in one." Second printing of Revised Edition, just off the press. Blue fabricoid binding, for \$3.00, from the Digest Press, Van Nuys, California, or Science News Letter.

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Books of the Week

► APPROXIMATELY 2,000 terms used in machine shops, industry and engineering literature are given in **DICTIONARY OF ENGINEERING AND MACHINE SHOP TERMS** by A. H. Sandy. They are defined in language that is understandable to the ordinary machinist. (Chemical Pub. Co., \$2.75).

Science News Letter, February 17, 1945

► THE PRINCIPLES and underlying theory in the field of crystal structure is given in **THEORY OF X-RAY DIFFRACTION IN CRYSTALS** by W. H. Zachariasen. It is a book for advanced students based on lectures given graduate students in an American university. (Wiley, \$4).

Science News Letter, February 17, 1945

Just Off the Press

AIDS TO TECHNICAL WRITING—Richard C. Jordan and Marion J. Edwards—Univ. of Minn., 117 p., paper, illus., 50c (Univ. of Minn., Eng'g Exp. Station Bull. no. 21).

AMERIGO VESPUCCI, PILOT MAJOR—Frederick J. Pohl—Columbia Univ. Press, 249 p., illus., \$3.

BOOK REPUBLICATION PROGRAM, List III (Cumulative)—Office of Alien Property Custodian, 102 p., paper, free.

A COMPARATIVE DICTIONARY OF THE TAHITIAN LANGUAGE, Tahitian-English with an English-Tahitian Finding List—Edmund Andrews and Irene D. Andrews—The Chicago Academy of Sciences, 253 p., paper, \$5.

CURRENT ABBREVIATIONS—George Earle Shankle—H. W. Wilson, 207 p., \$3.

DICTIONARY OF ENGINEERING AND MACHINE SHOP TERMS—A. H. Sandy—Chemical Pub. Co., 153 p., \$2.75.

ENRICHMENT OF FLOUR AND BREAD, a History of the Movement—Russell M. Wilder and Robert R. Williams—National Research Council, 130 p., paper, free (National Research Council, Bull. no. 110).

THE FLORIDA SEMINOLE CAMP—Alexander Spoehr—Field Museum, 33 p., paper, illus., 50c (Anthropological Series, Pub. no. 567).

THE HOPI WAY—Laura Thompson and Alice

Joseph—Univ. of Chicago Press, 151 p., illus., \$3.

HOW YOU CAN GET A BETTER JOB—Willard K. Lasher and Edward A. Richards—Am. Tech. Soc., 206 p., illus., \$1.50, 2nd ed. An inspirational book on how the worker can improve himself.

MANUAL OF CLINICAL MYCOLOGY—Norman F. Conant and others—W. B. Saunders, 348 p., illus., \$3.50.

MEGAFALUNAL ZONES OF THE OLIGOCENE OF NORTHWESTERN WASHINGTON—J. Wyatt Durham—Univ. of Calif. Press, 211 p., paper, illus., \$1.50 (Dept. of Geological Sciences, Bull., vol. 27, no. 5).

METHODS IN CLIMATOLOGY—Victor Conrad—Harvard Univ. Press, 228 p., illus., \$4.

MUMMIES—Richard A. Martin—Chicago Natural History Museum, 18 p., paper, illus., 25c (Anthropology Leaflet no. 36).

NEW NORTH AMERICAN FLEAS—Robert Traub—Field Museum, 9 p., paper, 10c (Zoological Series, no. 566).

THE NOCTURNAL MAXIMUM OCCURRENCE OF THUNDERSTORMS IN THE MIDWESTERN STATES—Lynn L. Means—Univ. of Chicago Press, 38 p., paper, illus., 75c (Dept. of Meteorology, Misc. Report, no. 16).

PEACE IS A PROCESS, Selected Articles from The Rotarian Magazine Charting Post-war Opportunities Created by New Forces in World Affairs—Leland D. Case, ed.—Rotary International, 127 p., paper, illus., 25c.

THEORY OF X-RAY DIFFRACTION IN CRYSTALS—William H. Zachariasen—Wiley, 255 p., illus., \$4.

WAVES IN THE EASTERLIES AND THE POLAR FRONT IN THE TROPICS—Herbert Riehl—Univ. of Chicago Press, 79 p., paper, illus., \$1.25 (Dept. of Meteorology, Misc. Report, no. 17).

WHAT IS VOCATIONAL EDUCATION—George H. Fern—Am. Tech. Soc., 159 p., illus., \$2.50. Of interest principally to teachers.

Science News Letter, February 17, 1945

AERONAUTICS

Veteran Mechanical Lung Presented to Inventor

► A MECHANICAL LUNG, or turbosupercharger, that has served on a B-17 Flying Fortress for over 1,000 hours of flying was presented to Dr. Sanford A. Moss, inventor of the turbosupercharger, by the 381st Bombardment Group of the Eighth Air Force in England. The lung has been used on 102 combat missions against German industrial and military targets.

"Although grueling demands of high altitude combat flying wear out the average good turbo in around 500 hours, this turbo apparently is as sound in its 1,004th hour as in its first," stated a report from

an AAF sergeant who had examined the lung in England.

Under the direction of Dr. Moss, the General Electric Company has produced nearly 300,000 turbosuperchargers, making efficient stratosphere operations possible for fighting planes and bombers of the U. S. armed forces.

The turbosupercharger is essentially a combination of compressor and gas turbine. In the turbosupercharger, flaming hot gases exhausted from a combustion engine operate a turbine which drives a compressor for supplying air to the engine. The engine thus is enabled to "breathe" normally in the thin air of high altitudes.

As exhaust gases leave an airplane engine at super-hurricane speed and are destructive to ferrous metals, many problems in metallurgy and design engineering had to be overcome before the device would operate successfully. It spins at whirlwind tempo, with the turbine blazing hot at approximately 1,500 degrees Fahrenheit. The compressor, only a few inches away, compresses air as cold as 76 degrees below zero.

Science News Letter, February 17, 1945

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Box 27, Leesburgh, Ohio

• New Machines and Gadgets •

⚙️ **TIME-CLOCK** control for radio receivers can be set to interrupt other programs and throw in automatically any desired program at the proper time. It has a frequency pre-selector with an auxiliary condenser which is manually operated to pre-select the station, and clock mechanism to substitute this condenser at the right time.

Science News Letter, February 17, 1945

⚙️ **PLASTIC CLIP**, to hold a pencil in a pocket, and a transparent plastic barrel and magazine to hold extra leads, are held permanently in a single unit by means of a sleeve cemented to the barrel or its cap. The clip is the same material and color as the barrel within which the leads are visible.

Science News Letter, February 17, 1945

⚙️ **MARBLE DISPENSER**, to be carried on a belt about the body of a marble-shooter to save losses and pocket wear, resembles the coin dispenser used by streetcar conductors. The marbles, inserted in openings in the top, are released singly below when a lever is pressed.

Science News Letter, February 17, 1945

⚙️ **FLATBOAT** operated by an automobile carries the car and is powered by the car's engine. The car is driven onto its flat deck and locked in place with the rear wheels jacked up. Wide flat belts which extend below, over drive wheels on the propeller shaft, are passed over these wheels.

Science News Letter, February 17, 1945



⚙️ **SYNTHETIC RESIN** called compar is replacing rubber in certain washers, seals, gaskets, diaphragms and other flexible articles because of its elasticity, flexibility and abrasion resistance. The articles, as illustrated, are molded of this vinyl resin derivative into various shapes.

Science News Letter, February 17, 1945

⚙️ **COMBINED** compass, protractor and ruler for drafting has flat plastic legs hinged at the top that hold the pin-point and lead. A scale is on one side of the outer edge of one leg, the protractor is on the other side with the lines to measure degrees extending across both legs.

Science News Letter, February 17, 1945

⚙️ **LAWN SWING**, operated without outside aid by leaning backward and forward, has a swinging box with seat suspended at its center on two swinging arms, and a rod extending from its front to the top of one swinging arm. Geared wheels join the rod and arm.

Science News Letter, February 17, 1945

⚙️ **ANTENNA** for automobile radios, adjusted electrically, is a telescoping metal structure that may be projected above the top of the car by means of a small motor at its base and lowered by the same motor. An electric switch within the car, in easy reach of the driver, is turned to the right or left.

Science News Letter, February 17, 1945

If you want more information on the new things described here, send a three-cent stamp to **SCIENCE NEWS LETTER**, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 246.

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Question Box

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ENGINEERING

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What six reasons may be given by men when they tell you why they married or want to marry? p. 106.

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